Eolian fissure filling sediments of karstified limestones in the Carpathian Basin

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The filling sediments of fissures and caves of various origin were studied in the northern and southern part of the Carpathian Basin. The sediments represent various red clays (red paleosols), redeposited loess and in some cases sandy siltstones as well. The granulometry of these sediments was studied by laser diffraction method (Malvern Mastersizer 3000, Hydro LV). Special attention was paid to the geological relations of the localities. The study sites were: Ivanovce and Včeláre (Slovakia), Beremend and Csarnóta (Hungary). According to the morphological characteristics, the rodent association from these localities can be placed in the Pliocene and Early Pleistocene.

Mesozoic paleokarst limestones served as a dust trap for the Pliocene/Pleistocene red clay (paleosol) deposits in the Carpathian Basin. This study evaluates a silt/clay-rich geological deposit, paleo-cave/karst fissures sediments derived from mixtures of dust (eolian silt) and karst breccias. Evidence that the fluvial cave/fissure sediments in the Triassic–Cretaceous limestones are derived from this eolian red clay include compositional and textural matches, especially grain size distribution trends vertically downward from the former landscape surface. These grain size trends indicate infiltration of the eolian red clay into the underlying karst system. The deposits also contain abundant vertebrate fossils. Faunas accumulated in fissure fillings of karstified limestone and thus provide a minimum age for the subaerial exposure (exhumation) of the bedrock at the given site.

Various environmental factors could be recognised by the statistical evaluation of the grain size distribution curves of fissure fillings and cave sediments, like the effects of eolian transport, type of the parent rock, the weathering process and ways of underground sediment transport. Cave sediments have distribution curves with a single/double maximum in the clay size class. Distribution curves with a single maximum in the silt size class are typical for the debris of the overlying siltstone, for the redeposited loess and for the red paleosol underlying the loess. Red clay fissure fillings display bimodal distribution curves with maxima both in the clay and silt classes.

Late Cenozoic cave/fissure sediments are increasingly utilized as archives of geologic change. The role of dust (eolian silt), including its inherited compositional and textural properties from

a distant source area, land-atmosphere transfer processes, and resedimentation processes on the land surface overlying the cave-karst system, remain promising areas for research.

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